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# DAMAGE TO POLES BY TERMITES OR WHITE ANTS IN CALIFORNIA

By T. E. Snyder

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Mr Swenden

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## Introduction

A wooden pole used for telephone, telegraph, electric light or power service is merely an uprooted dead tree with roots and bark removed - with or without more seasoning than it would obtain in nature as a standing dead tree. Its base is placed in the ground in a region either similar or totally different from that where, as a tree, it grew. Hence it is subject to attack by wood-boring insects and decay or rot just as is a dead tree.

Poles, in general, were not formerly treated with chemical wood preservatives - as is now almost universally necessary for proper protection from wood-boring insects and wood-destroying decay.

Termites or white ants are one of the most destructive types of insects which damage and destroy poles.

## Description and Habits of Termites or White Ants

Termites or "white ants" are not true ants, although they are superficially antlike and live in large colonies made up of different forms or castes, and are social insects. In these nests or colonies both wingless and winged mature individuals are produced. The brownish, or blackish, elongate, slender, antlike, sexed adults with long white wings unlike the other forms, have functional eyes and are able to endure full sunlight. These migratory males and females appear normally only once a year during a short period, during the Spring and Fall, when there is a colonizing migration to begin new colonies.

The grayish-white, soft-bodied, wingless "workers" are in reality the destructive form. These workers make the excavations and enlarge and extend the colony as this becomes necessary. They live underground, shun the light and are, therefore, rarely seen. In the non-subterranean termites there are no workers, their duties being taken over by the immature nymphs or young. The soft-bodied, wingless "soldiers", which have elongate, narrow heads armed with long, slender, saber-shaped jaws, and the workers are the most numerous forms permanently present in the colony. Other forms in the colony are the reproductive individuals; in some colonies these consist of a single pair, the normal king and queen, while in other

colonies many nymph-like types may be present. These reproductive forms never reach the size attained by those of certain species of termites in the Tropics, and never lose the power of movement.

## Termites of Two Different Types Damage Poles

There are two types of termites in California, the smaller subterranean and larger non-subterranean type; the former type of termite always attacks poles and other timber from the ground through which these termites burrow and with which they must maintain contact in order to obtain the moisture so necessary to their life and their chief injury to poles is usually near the ground line - the point of greatest structural weakness in the pole. Damage to poles by these subterranean termites may, however, extend high up in the pole and the wood be completely honeycombed up to considerable heights. The burrows are usually longitudinal and follow the grain of the wood. Often decay or rot is associated with their damage and the pole is seriously structurally weakened.

Earth-like shelter tubes are sometimes built on poles, especially along, in and over seasoned checks by means of which termites are able to penetrate poles improperly treated with chemical wood preservatives.

The latter type of termite or the non-subterranean type never burrows in the ground, does not need much moisture for life, and attacks wood directly - flies to the wood and bores in. Poles are usually attacked considerably above the ground line or point of greatest weakness, and are damaged in the middle and top - cross arms and insulator pegs are also damaged by this "dry wood" termite. This termite can live in wood containing less than 10% of moisture normal to air dried wood and unlike the subterranean termites is not closely associated with decay. A method of detecting their presence in the wood or poles is the small, oval, impressed pellets or excreted wood which fall from the poles and can be seen in piles at the base or along the sides.

Sometimes the galleries of these two types of termites meet near the base of the pole. Unlike the subterranean termites, chambers of the non-subterranean termites may cut across the grain of the wood.

The subterranean termites damage poles in all section of the state, but similar serious injury by the non-subterranean termites occurs only in the southern portions of California - not far north of Monterey on the coast. The San Joaquin Valley has experienced no injury from non-subterranean termites. Hence, while of great importance, due to their habits which enable them to damage poles which have the butts or bases only impregnated with chemical preservatives, their limited distribution renders them less dangerous. Also, while non-subterranean termites seriously damage poles, often from top to near the bottom, their

injuries are to those portions of poles where great structural strength is not so important. Injury to that area of the pole just above and below the ground line by subterranean termites structurally weakens poles and they "go down" or fall over usually during the stress of a storm. Although heavily infested with non-subterranean termites poles usually continue to stand in the line.

Sometimes the infestation by non-subterranean termites of outer layers of the middle and upper portions of poles so weakens and softens the wood that the spurs of the lineman can not grip into the wood, slip and make the poles dangerous to climb.

Since both the subterranean and non-subterranean termites are native, there is no reason to believe that they will spread outside of their natural range or habitat but due to man's destruction of their natural breeding places in the forests (with the felling of forests and clearing of land and advancing civilization and cultivation) they will probably become increasingly destructive to poles and other works of man.

## Methods of Protecting Poles from Attack by Termites

No general recommendations for the preservative treatment of poles can be made for the entire state of California. Indeed it is largely a matter for each individual company utilizing poles to determine the methods most suitable for preserving poles based on possible investment, length of service required and the amount of damage experienced by one or both of these types of termites - as well as decay or rot. The entomologist can advise as to the type of termite doing the damage and give advice as to the possibility of injury by other types but he can not and should not be expected to give general advice - not applicable for use of all types of users of poles. Statements can be made however as to amount of protection and length of service to be expected from different types of preservative treatments. Also advice can be given as to how to prolong the life of termite infested poles already in service.

## Superficial Preservative Treatments

Impregnation with standard grades of coal tar creosote is the most effective and practicable method of wood preservation for poles where long service is to be required. Such treatment is costly but thoroughly protects poles from attacks from wood-boring insects and wood-destroying decay.

Such superficial methods of application as brushing or dipping poles with or in coal tar creosote are only temporarily effective, but will add length of service to poles. In commercial enterprises, the type of treatment must necessarily be determined by cost and length of service to be expected.

When brush treatments are used, only high-grade antiseptic preservatives such as standard grades of coal tar creosote oils or carbolineums should be employed, since the cost of application of brush treatments is often high. The cost of any treatment should necessarily be more than offset by the longer service assured by the application. The several methods of application or impregnation of the preservative should be determined by the length of service required and the consequent expenditure warranted.

Brushing several coats of coal tar cerosote on timber may add from 2 to 5 years to its life; red or green pigments may be added to the oil to give the wood a painted appearance.

Both brushing and dipping applications of coal tar creosote penetrate the wood but slightly and permanent protection is not to be expected. After such treatments the poles often season check and these crevices afford entrance to both insects and decay.

## Impregnation Preservative Treatments

### Open Tank

Impregnation of the butts of poles with coal tar creosote by the open tank method will effectively protect poles from attack by the subterranean types of termites and decay near the ground line - where the greatest structural strength is required in poles.

Impregnation by the "open-tank" method with coal tar creosote renders wood resistant to attack by these termites for at least 15 years. The open tank method can be utilized in treating poles with makeshift or homemade equipment and unskilled labor can be employed.

In the case of improperly seasoned poles or in certain climates the wood might open up with season checks which extend deeply into the pole beyond or below the outer treated area. The penetration attained by this impregnation process is not always great and can not compare with that obtained by using a pressure process.

### Pressure Process

On the average for the United States as a whole, impregnation of the pole for its entire length by the "full cell" (at least 12 lbs. per cu. ft.) pressure process in large steel cylinders with coal tar creosote of standard grades renders the wood resistant to termite attack for at least 30 years. *

* - There are sections of the country where a percentage of well treated individual poles will be attacked by termites in appreciably less than 30 years, the period of such resistance being lessened by changes in the composition of the creosote resulting from service exposure.

If, as in cities, there is danger of the creosote "bleeding", "sweating" or oozing out in hot weather, the "empty cell" method can be used for poles, where under a vacuum, part of the creosote oil can be withdrawn and there is no danger of persons soiling their clothing by contact with such wet creosoted poles. Furthermore, they are less difficult and disagreeable to handle, and the setting crews do not object to working with them. The use of heavy gloves and a little care should overcome all difficulties in workmen handling creosoted poles.

The use of a pressure process requires special expensive equipment and skilled labor. Most companies utilizing such impregnated poles purchase them. By the use of increment borers the average penetration of the creosote can be determined. In the case of southern yellow pine with much sapwood a uniform penetration of three inches can be attained. While Douglas fir has been more difficult to impregnate a satisfactory penetration to the extent of the sapwood can be attained.

In areas where they are seriously damaged by non-subterranean termites, pine or Douglas fir cross arms and insulator pegs or pins can also be impregnated with coal tar creosote.

## Creosoted Poles can be Painted

If it is desired - as in cities - to paint poles after impregnation they can be painted with an aluminum paint - over the creosote - and the creosote will not show through. After this coat the aluminum paint can be repainted, if other colors are desired.

## Combination of the Impregnation and Superficial Perservative Treatments

After the butts of poles have received an open tank impregnation treatment, if they are dipped for their entire length in an elongate vat filled with hot coal tar creosote, some protection will be afforded to the portion of the pole other than the butt from attack by non-subterranean termites and decay. This vat should be wide and deep enough to hold at least 3 or 4 poles at once and the poles should be turned or creosote slopped over them with a scoop.

This is in no sense an open tank treatment but should offer some protection to the pole; the creosote penetrates season checks and other holes. It is not an expensive treatment compared to full length impregnation of poles and homemade equipment and unskilled labor can be used. While still in the experimental stage the combination process appears promising. Old poles which have been infested by the non-subterranean termites can also be so treated after they have been removed and their length of service in the line prolonged.

## Preservative Treatments for Poles Already Set or in Place

Due to the large amount of money invested in standing poles, experiments have been conducted for sometime with the view of prolonging their life.

### Stumping

Poles damaged at the base are sometimes braced by fastening to them an auxilliary stub or stump impregnated with coal tar creosote.

### Resetting

The butts of damaged poles are cut off and the portion of the pole to go in the ground is brushed with coal tar creosote. This, of course, lowers the height of the wires.

### Charring and Spraying

The butts of poles are charred with a blow torch and then sprayed with coal tar creosote or kerosene oil thus ensuring greater penetration of these oils.

### Cold Treater Dust

Cold treater dust, an arsenical residue or waste in the smelter, is placed about the base of the pole to some depth below ground. This treatment may protect the pole from subterranean termites and decay. The experiments are as yet not conclusive.

### Spraying or Fumigation

So far as we have records, such treatments give no permanent protection to poles from termite attack. No penetration is secured with the poisonous chemicals into the wood and the gases have no permanent results in sterilizing the wood or soil. These statements apply only to continental United States.

## Heat Sterilization

Where it is desired to stop the working of non-subterranean termites in standing poles which have been removed, or in untreated poles infested before placed in service, they can be subjected to a temperature of 135°F. to 150°F. with a saturated atmosphere or 100°C humidity in a tight chamber such as a kiln. This temperature maintained for 1½ hours will kill the termites.

Such treatment is not necessary in the case of the subterranean termite which will dry up and die soon after the pole is removed from the moist soil - they must maintain contact with the earth in order to obtain the moisture so necessary to their life.

## Difference in Soils

Subterranean termites will not attack poles set in a constantly water saturated soil or in soils saturated with salts - alkaline.

## Infestation of Poles Before Service

In the case of pole yeards where old poles infested with non-subterranean termites are stored in order to be salvaged, no untreated new poles should be stored. These termites will live more or less indefinitely in the old poles and, when they fly or swarm once each year in late summer or early fall in California, they will attack the new poles. These poles then will be infested before any service in the line.

## The More Important Conclusions

Termite damage to poles in California is most serious; that by subterranean termites is fairly widespread and serious. This injury can be prevented by treating the butts of the poles with coal tar creosote. Damage by non-subterranean termites is less widespread and serious. Impregnation of the entire pole with coal tar creosote by a pressure process will prevent such damage, but involves a large outlay of capital. A combination of butt treating poles and then dipping the entire pole in coal tar creosote may prove to be a less expensive compromise. Certain measures can be taken to prolong the life of poles already in the line as a form of insurance of capital invested. Poles infested with non-subterranean termites should not be stored in yards where new untreated poles await placement in storage.

The treatment to be given poles must be decided by the user basing conclusions on amount of loss, length of service to be expected and capital available.



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T. E. Snyder,
Entomologist.